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## Enhancing the Li/Na-Ion Battery Performances by Order/Disorder Engineering

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# Enhancing the Li/Na-Ion Battery Performances by Order/Disorder Engineering

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Further enhancement of the performances of Li/Na ion batteries (LNB) is challenging when using the existing technical approaches. Therefore, we have chosen a different route, i.e., the disorder/ordering engineering to fabricate high performance cathodes/anodes/electrolytes, and this route could be potentially important for developing full solid batteries or full glass/glass ceramic batteries. The disorder/order engineering concept refers to the following aspects. The disordered or amorphous structure in cathode/anode materials is created via sol-gel or biotemplating or melt-quenching or ball-milling, and afterwards the ordered nano-domains in the disordered matrix phase are generated through heat-treatment and the newly discovered Li-ion intercalation/extraction induced nucleation. Conversely, long-range order solids are transformed into disordered or amorphous ones by ball-milling or by the newly discovered Li-ion discharging/charging induced amorphisation, and thereby enhancing ionic/electronic conductivities. In this talk, we present two case studies, which deal with cathodes and anodes concerning the effect of the order/disorder tuning on the electrochemical performances of Li/Na-ion batteries.

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